

**What is claimed is:**

## 1. A motor having a magnetic bearing comprising:

- a base provided with a bearing seat;
- a stator fixed onto the base;
- a rotor equipped with a rotation shaft and rotating relatively to the stator by magnetic forces generated from excitation;
- a bearing fastened to the bearing seat of the base for accommodating the rotation shaft of the rotor; and
- a magnetic unit composed of a first, a second and a third magnetic elements, wherein the second magnetic element is located below the first magnetic element; the third magnetic element is located below the second magnetic element; by employing the magnetic unit, the second magnetic element is restrained between the first and third magnetic elements, and therefore limiting a shift range of the rotation shaft.

2. The motor having a magnetic bearing as described in claim 1, wherein the first magnetic element is anchored to the bearing seat, the second magnetic element is telescopically fitted to the outside of the rotation shaft, and the third magnetic element is secured onto the base.

3. The motor having a magnetic bearing as described in claim 1, wherein the first magnetic element is ring-shaped with its center hole telescopically fitted to the rotation shaft; the second magnetic element is anchored to the bearing seat, and the diameter of the center hole of the second magnetic element is larger than that of the rotation shaft such that

the rotation shaft passes through the center hole of the second magnetic element, both of them do not come into contact with each other; the third magnetic element is ring-shaped with its center hole telescopically fitted near the lower end of the rotation shaft.

4. The motor having a magnetic bearing as described in claim 1, wherein the first and second magnetic elements are of the same pole and repulsive to each other, and the second and third magnetic elements are of the same pole and repulsive to each other.

5. The motor having a magnetic bearing as described in claim 1, wherein the first and second magnetic elements are of opposite poles and attractive towards each other, and the second and third magnetic elements are of opposite poles and attractive towards each other.

6. A motor having a magnetic bearing comprising:

a base provided with a bearing seat;

a stator fixed onto the base,

a rotor equipped with a rotation shaft and rotating relatively to the stator by magnetic forces generated from excitation;

a bearing fastened to the bearing seat of the base for accommodating the rotation shaft of the rotor;

an upper magnetic unit composed of a first and a second magnetic elements, wherein the first magnetic element is located above the second magnetic element to generate a magnetic force therebetween to prevent

the contact with each other; and

a lower magnetic unit composed of a third and a fourth magnetic elements, wherein the third magnetic element is located above the fourth magnetic element to generate a magnetic force therebetween to prevent the contact with each other.

7. The motor having a magnetic bearing as described in claim 6, wherein the fourth magnetic element is ring-shaped with its center hole telescopically fitted near the lower end of the rotation shaft; the third magnetic element is secured to the lower end of the bearing, and the diameter of the center hole of the third magnetic element is larger than that of the rotation shaft such that when the rotation shaft passes through the third magnetic element, both of them do not come into contact with each other.

8. The motor having a magnetic bearing as described in claim 6, wherein the third magnetic elements is ring-shaped with its center hole telescopically fitted to the rotation shaft; the fourth magnetic element is secured onto the bearing seat, and the diameter of its center hole is larger than that of the rotation shaft such that when the rotation shaft passes through the third magnetic element, both of them do not come into contact with each other.

9. The motor having a magnetic bearing as described in claim 6, wherein the first and second magnetic elements magnetic elements are of the same

pole and repulsive to each other, and the third and fourth magnetic elements are also of the same pole and repulsive to each other.

10. The motor having a magnetic bearing as described in claim 6, wherein the first and second magnetic elements are of opposite poles and attractive towards each other, and the third and fourth magnetic elements are also opposite poles and attractive towards each other.

11. A motor having a magnetic bearing comprising:

- a base provided with a bearing seat;

- a stator fixed to the base,

- a rotor equipped with a rotation shaft and rotates relatively to the stator by magnetic forces generated from excitation;

- a bearing fastened to the bearing seat of the base for accommodating the rotation shaft of the rotor;

- a magnetic unit composed of a first and a second magnetic elements, wherein the second magnetic element is located below the first magnetic element to provide an axial magnetic force and compensate the magnetic bias formed between the stator and the rotor, thus obtaining constant magnetic equilibrium.

12. The motor having a magnetic bearing as described in claim 11, wherein the first magnetic element is fixed to the bearing seat and the second magnetic element is ring-shaped with its center hole telescopically fitted to the rotation shaft.

13. The motor having a magnetic bearing as described in claim 11, wherein the first magnetic element is ring-shaped with its center hole telescopically fitted to the rotation shaft; and the second magnetic element is anchored to the bearing seat, and the diameter of its center hole is larger than that of the rotation shaft such that when the rotation shaft passes through the center hole of the second magnetic element, both of them do not come into contact with each other.

14. The motor having a magnetic bearing as described in claim 11, wherein the first and second magnetic elements are of the same pole and repulsive to each other.

15. The motor having a magnetic bearing as described in claim 11, wherein the first and second magnetic elements are of opposite poles and attractive towards each other.